Sample Proposal

Applicant:
ABC Private University

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Project Starting Date and Ending Date: April 2010 to November 2011

Measuring Irrigation Water Quality on Fruit and Vegetable Farms

Priority Area: Research

Abstract:
Partner with State B, C, D, E, F, and G to objectively measure the quality of irrigation water used on fruit and vegetable farms in several states to help shape future irrigation water standards, improve on-farm risk assessment, provide strategies for implementing a water testing program, aid in interpreting water testing results, and provide assistance for understanding when mitigation strategies should be adopted.

Project Purpose:
This project is focused on the collection of scientific data on irrigation water quality in the seven states to contribute to the National Irrigation Database organized by the National GAPs Program at Cornell University for fresh fruit and vegetable production in the National Food Safety Program. Consequently, this activity may help shape future national irrigation water standards. Moreover, educational workshops on irrigation water quality management will be provided to Extension professionals and producers. This effort will improve on-farm risk assessment, provide strategies for implementing a water testing program, aid in interpreting water testing results, and provide assistance for understanding when mitigation strategies should be adopted.

Fruit and vegetable crops tend to be irrigated with surface water sources, such as ponds and streams. While there is concern with all sources of water for pre-harvest use, surface water has a higher probability of being exposed to more fecal contamination than ground water. This is expected to pose greater human health risk than irrigation water from deep aquifers with properly constructed and protected wells. In most cases, the sanitary quality of surface water used for irrigation is not known because it is not regularly tested.

This project has not been submitted to or funded by another Federal or State grant program.

Potential Impact:
Contamination of fresh fruits and vegetables with pathogens can occur anywhere in the supply chain, and once it occurs, it is difficult, if not impossible, to remove. The FDA Produce Safety Action Plan states that the most likely points of contamination of high risk commodities by key pathogens occur during pre-harvest production. Among these points, one of the most likely potential mechanisms of *E. coli* O157:H7 and *Salmonella* contamination is water (irrigation or flooding/runoff from adjacent land).

The fruit and vegetable industry accounts for nearly $75,000,000 in annual sales and is comprised of over 5,000 farms over the seven involved states. This project will impact the local and regional fruit and vegetable industry by providing an objective assessment of the quality of water currently used for irrigation, evaluating the ability of currently-used criteria to discern contamination by key pathogens, and providing information to Extension professionals and producers to improve on-farm irrigation water management. Furthermore, by maintaining buyer and consumer confidence in and demand for fruit and vegetable production in the State will potentially enhance farm viability and profits.

Expected Measurable Outcomes:
The **GOAL** of this project is to participate in the development of a National Irrigation Database. The database will provide new scientific data to support comprehensive efforts by the produce industry and public health regulators to create meaningful and realistic water quality standards that minimizes microbial food safety hazards to fresh and fresh-cut vegetables posed by surface irrigation (**TARGET**). There has not previously been an effort to measure current irrigation water quality (**BENCHMARK**). Irrigation water samples will be taken four times during the production season. Results will be compiled and analyzed by crop, region, source and time of sampling. These results will be added to the National Irrigation Database (**PERFORMANCE MEASURE**).

Work Plan:
Baseline water quality data will be collected four times during the production season on water samples on ten farms in each of three geographically diverse regions of the State, with varied irrigation sources (rivers, ponds, lakes, streams, wells, springs, etc.). A total of thirty farms will be chosen for each year of the project, providing data from 60 farms over the two year life of the project. This data will be added to the National Irrigation Database developed by the National GAPs Program at Cornell University.

Quality analyses will include quantified generic *E. coli,* specific conductance, turbidity and pH and will be performed by certified private laboratories capable of these analyses. Since one of the objectives of this project is to educate growers and farm managers about the importance of on-farm irrigation water management practices for microbiological criteria, this is a perfect

opportunity to conduct one-on-one training for water sampling with individual growers. Repeated site visits will provide training reinforcement and quality control. A minimal component site survey and adjacent land-use analysis for potential water quality impacts will be conducted at each sampling site. The site evaluation template will be adopted from the USDA GAP audit checklist.

Timeline: April 2010 to November 2011

Timeline	Who's Responsible	Project Activity
(April 2010 – September 2010)	ABC Private University	Collect irrigation water samples from 10 farms in each of 3 geographic regions, four times over the production season (10 farms x 3 regions x 4 sampling times= 120 samples)
(August 2010 – November 2010)	ABC Private University	Develop workshop materials and factsheets for water sampling, testing and mitigation strategies to reduce microbial load
(April 2011 – September 2011)	ABC Private University	Collect irrigation water samples from 10 farms in each of 3 geographic regions, four times over the production season (10 farms x 3 regions x 4 sampling times= 120 samples)
(August 2011 – November 2011)	ABC Private University	Provide workshops on irrigation water quality and management for Extension professionals and growers in 3 regions

Budget Narrative ($30,000.00):

Budget Item	2010	2011	Total
Supplies			
Research Supplies	$1,750.00	$0.00	
Total Supplies			**$1,750.00**
Travel			
Travel	$3,750.00	$5,250.00	

Total Travel			**$9,000.00**
Contractual			
XYZ Laboratories (water testing)	$8,600.00	$7,600.00	
Total Contractual			**$16,200.00**
Other Costs			
Shipping Costs	$550.00	$0.00	
Publication Costs	$0.00	$1,000.00	
Workshops, Materials, and Media	$0.00	$1,500.00	
Total Other			**$3,050.00**
Funds Requested	**$14,650.00**	**$15,350.00**	
			$30,000.00

Supplies ($1,750)

Dr. Joe Smith and his research assistant will need research supplies such as sample tubes, boxes and trays for transportation, and water samplers. These items will total **$1,750.00**.

Travel Narrative ($9,000)

ABC Private University's established automobile mileage rate is $0.40/mile. To complete the objectives of this project, the project staff will need to travel an average of 170 miles in the eastern region of the State, 360 miles in the central region of the State, and 620 miles in the western region of the State. This is a total of 1,150 miles for one trip or $460 (1,150 miles x $0.40). There will be a minimum of 4 trips per year for a total of **$1,840** along with an additional average 200 miles per region to collect samples from each farm for a total of **$960** (4 trips x 3 regions x 200 miles x $0.40). There will be 4 trips to the central and western regions that requires 2 nights at hotels. These charges will total **$560** ($70/night x 8 nights). ABC Private University's Per Diem rate for meals ($39/day), while traveling for 10 days, will total to **$390** ($39/day x 10 days). Each of the items included in the Travel, Training, and Workshop section totals to the amount of (**$3,750.00**) for the 2010 budget.

The sampling travel costs will be the same for the 2011 budget; however, additional costs for travel to two workshops in each region (one for Extension agents and one for growers). The eastern region will not require travel costs; therefore, the total amount needed for travel to 2 regions for 2 workshops is $375 per event for a total of **$1,500.00**. Consequently, the 2011 budget is **$5,250.00** ($3,750 + $1,500). Total travel requested is **$9,000**.

Contractual Narrative ($16,200)

We will contract with XYZ Laboratories in order to perform the water analysis of all the samples gathered by the project investigators. This quality analysis will be performed for a flat rate of **$7,600.00** per year of the project for a total of **$15,200** ($7,600 x 2).

Each lab that enters data will need a secure password and some training for data input. This will have an initial cost (approximately **$1,000.00**). Currently quality control procedures are performed for all data entered into the database with the lab data form. This too requires time, but is not necessary once the lab understands the data entry portal and how it works. Total contractual funds requested is **$16,200.**

Other Costs Narrative ($3,050)

There are certain areas in the State that are considered to be inadequate for transferring water samples by vehicle. The cost associated with shipping these samples is **$550.00**.
In year two, workshops will be offered for Extension professionals through train-the-trainer sessions and growers in each of the three regions of the state, covering proper irrigation water sampling, choosing the proper sanitary water tests, interpreting the test results and selecting mitigation strategies (**$1,500.00**). Training materials will be developed both for hard-copy and web dissemination. Presentations will also be developed for the workshops and available to the Extension professionals for use in their home counties (**$1,000.00**). Total Other Costs are **$3,050**.

Project Oversight:

Dr. Doug Smith will oversee the advancement of this project, which will include data collection, analysis, and outreach activities. The labs doing the analysis will have access to the database so the data can go directly into the database. Dr. Doug Smith also will work directly with growers and Extension professionals across the state to sample water from fruit and vegetable farms using various irrigation sources. Outreach programs will be offered to growers for implementing water testing programs, interpreting water test results, and understanding when mitigation strategies should be adopted.

Project Commitment:

Project partners are committed to the implementation of all aspects of this water quality project. In fact, there has been a Memorandum of Understanding signed between all States involved in this project to ensure the quality of the cooperation between these entities. The ABC Private University will lead implementation of the overall multi-state endeavor. Specifically, it will be responsible for the research, information, and outreach.

Multi-State Project:

Total Grant Request: $204,576.00
The State: $54,576
State B: $25,000 ***State C:*** $25,000 ***State D:*** $25,000
State E: $25,000 ***State F:*** $25,000 ***State G:*** $25,000
The project proposed here is intended to help fill the nationwide irrigation water quality knowledge gap by compiling and analyzing water samples for generic *Escherichia coli* (*E. coli*)

densities, pH, specific density and turbidity that will be incorporated into the National Irrigation Database. Collaborators in six other states are interested in participating in this nationwide effort. The states involved agreed to pursue funds to complete water quality work and enter data for the National Food Safety Program.

Specifically, the State has partnered with ABC Private University to act as the coordinating organization of this network of seven different states. ABC Private University will work with a board of water quality specialists that represent each state. The board has members and associates serving on committees including research, analysis, and outreach activities for the National Irrigation Database. This project has the full support of each participating States' Departments of Agriculture. The State will take the coordinating role in monitoring the progress of this project.